ETA-Danmark A/S
Göteborg Plads 1
DK-2150 Nordhavn
Tel. +45 72 24 59 00
Internet www.etadanmark.dk

Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

MEMBER OF EOTA

European Technical Assessment ETA-22/0638 of 2022/09/12

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S	
Trade name of the construction product:	Astro PFP FR Graphite
Product family to which the above construction product belongs:	Fire Stopping and Sealing Product: • Penetration Seals
Manufacturer:	Astroflame Fireseals Ltd Unit 8 The IO Centre, Stephenson Road, Segensworth, Fareham, Hampshire PO15 5RU United Kingdom
Manufacturing plant:	A/003
This European Technical Assessment contains:	28 pages including 2 annexes which form an integral part of the document
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	EAD 350454-00-1104
This version replaces:	-

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may be made, with the written consent of the issuing Technical Assessment Body. Any partial reproduction has to be identified as such.

Table of Contents

I. SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESSMENT 4
1 Technical description of the product 4
2 Specification of the intended uses of the product in accordance with the applicable European Assessment Document (Hereinafter EAD): EAD 350454-00-1104 5
3 Performance of the product and references to the methods used for its assessment 6
4 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE (HEREINAFTER AVCP) SYSTEM APPLIED, WITH REFERENCE TO ITS LEGAL BASE 7
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD 7
ANNEX A – Resistance to Fire Classification – Astro PFP FR Graphite 8
A.1 Flexible or Rigid wall constructions with wall thickness of minimum 100 mm 8
A.1.1 Penetration seals, in drywalls* and concrete/masonry walls 8
A.1.2 Penetration seals with no backing material, in drywalls and concrete/masonry walls 10
A.2 Rigid walls constructions with wall thickness of minimum 150 mm 12
A.2.1 Penetration seals for pipes, in concrete/masonry walls 12
A.2.2 Penetration seals for cables, in concrete/masonry walls 13
A.2.3 Penetration seals for pipes, in concrete/masonry walls 14
A.3 Timber wall constructions with wall thickness of minimum 100 mm 15
A.3.1 Pipe penetration seals, in timber walls 15
A.4 Rigid floor constructions with floor thickness of minimum 150 mm 18
A.4.1 Penetration seals, surface mounted in concrete floors 18
A.4.2 Penetration seals, surface mounted in concrete floors 20
A.4.2.1 20
A.4.3 Penetration seals, surfaces mounted in concrete floors 21
A.4.4 Penetration seals, surface mounted in concrete floors 23
A.5 Timber floor constructions with floor thickness of minimum 150 mm 25
A.5.1 Pipe penetration seals, in timber floors 25
ANNEX B – Air Permeability – Astro PFP FR Graphite 28

I. SPECIFIC PARTS OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of the product

1) Astro PFP FR Graphite is a sealant and pipe closure device used to form penetration seals where insulated metallic pipes, combustible pipes, combustible cable conduits and cables penetrate walls and floors.

2) The Astro PFP FR Graphite is supplied in liquid form contained within 310 & 380 ml cartridges and 600 ml foil packs. The sealant is gunned into the aperture in the separating element and around the service or services, to a specified depth utilising mineral fibre insulation backing material.

3) The applicant has submitted a written declaration that the product and/or constituents of the product contains no substances which have been classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No. 1272/2008 and listed in the 'indicative list on dangerous substances' of the EGDS – taking into account the installation conditions of the construction product and the release scenarios resulting from there.

   In addition to the specific clauses relating to dangerous substances contained in this European Technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

4) The use catagory of Astro PFP FR Graphite in relation to BWR 3 (Hygiene, health and environment) is IA1, S/W2

2 Specification of the intended uses of the product in accordance with the applicable European Assessment Document (Hereinafter EAD): EAD 350454-00-1104

Detailed information and data is given in Annex A.

The intended use of system Astro PFP FR Graphite is to reinstate the fire resistance performance of flexible wall, rigid wall and floor constructions, and timber wall and floor constructions, where they are penetrated by services.

1) The specific elements of construction that the system Astro PFP FR Graphite may be used to provide a penetration seal in, are as follows:

Flexible walls:	The wall must have a minimum thickness of 100 mm and comprise steel or timber studs* lined on both faces with minimum 2 layers of 12.5 mm thick boards.
Timber walls:	The wall must have a minimum thickness of 100 mm and comprise solid wood or cross-laminated timber
Rigid walls:	The wall must have a minimum thickness of 100 mm and comprise concrete, aerated concrete or masonry, with a minimum density of 650 kg/m^3.
Rigid floors:	The floor must have a minimum thickness of 150 mm and comprise aerated concrete or concrete with a minimum density of 650 kg/m^3.
Timber floors:	The floor must have a minimum thickness of 150 mm and comprise solid wood or cross-laminated timber.

* no part of the penetration seal may be closer than 100 mm to a stud, the cavity must be closed between the penetration seal and the stud, and minimum 100 mm of insulation of class A1 or A2 according to EN 13501-1 must be provided within the cavity between the penetration seal and the stud.

The supporting construction must be classified in accordance with EN 13501-2 for the required fire resistance period.

Astroflame Fire Protection Systems which involve services penetrating both sides of a flexible wall may also be used in the situation where the services penetrate one side of the wall only and the remaining side of the wall is not penetrated at the same point (i.e. the services continues on the inside of the wall). All fire integrity and thermal insulation ratings for such single-sided penetrations remain the same as for the equivalent double-sided penetration.

Where a backing material is described in Annex A, this can be replaced with Astro PFP FR Graphite if the total seal depth is the same or greater.

2) The system Astro PFP FR Graphite may be used to provide a penetration seal with specific supporting constructions and substrates (for details see Annex A).

3) The provisions made in this European Technical Assessment are based on an assumed working life of the Astro PFP FR Graphite of 30 years, provided that the conditions laid down in the manufacturers datasheet and instructions for the packaging/transport/storage/installation/ use/repair are met. The indications given on the working life cannot be interpreted as a guarantee given by the producer or the Technical Assessment Body but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

4) Type Z_2: intended for use at internal conditions with humidity classes other than Z_1, excluding temperatures below 0°C.

3 Performance of the product and references to the methods used for its assessment

Product-type: Sealant/Pipe closure		Intended use: Penetration Seal
	Basic Requirement	Performance
BWR 2 Safety in case of fire		
	Reaction to fire	B - s1, d0
	Resistance to fire	Annex A
BWR 3 Hygiene, health and environment		
	Air permeability	Annex B
	Water permeability	No performance assessed
	Content, emission and/or release of dangerous substances	Use categories: IA1, S/W2 Declaration of manufacturer
BWR 4 Safety in use		
	Mechanical resistance and stability	No performance assessed
	Resistance to impact/movement	No performance assessed
	Adhesion	No performance assessed
	Durability	Z_2
BWR 5 Protection against noise		
	Airborne sound insulation*	53 (0;-1) dB
BWR 6 Energy economy and heat retention		
	Thermal properties	No performance assessed
	Water vapour permeability	No performance assessed

* At 25 mm depth

4 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE (HEREINAFTER AVCP) SYSTEM APPLIED, WITH REFERENCE TO ITS LEGAL BASE

According to the decision 1999/454/EC – Commission Decision of date 22nd June 1999 on the procedure for attesting the conformity of construction products pursuant to Article 20(2) of Council Directive 89/106/EEC as regards fire stopping, fire sealing and fire protective products, published in the Official Journal of the European Union (OJEU) L178/52 of 14/07/1999, (see https://eur-lex.europa.eu/oj/direct-access.html) of the European Commission[1], as amended, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table(s) applies (apply).

Product(s)	Intended use(s)	Level(s) or class(es)	System(s)
Fire stopping and Fire Sealing Products	For fire compartmentation and/or fire protection or fire performance	Any	1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark A/S prior to CE marking

Issued in Copenhagen on 2022-09-12 by

Thomas Bruun

Managing Director, ETA-Danmark

[1] Official Journal of the European Communities L178/52 of 14/7/1999

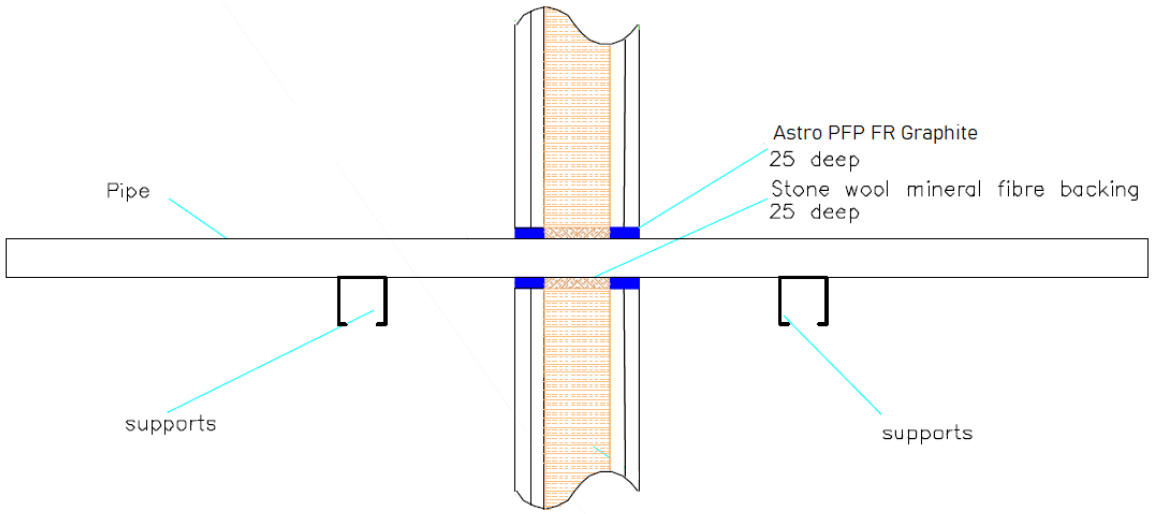
ANNEX A – Resistance to Fire Classification – Astro PFP FR Graphite

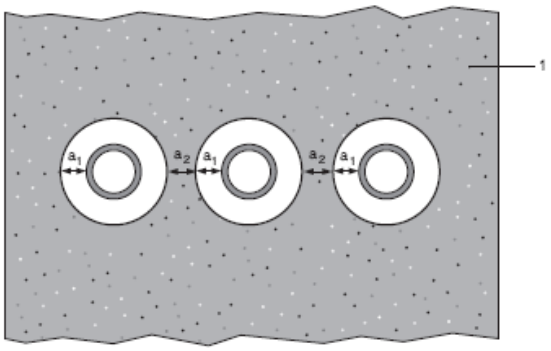
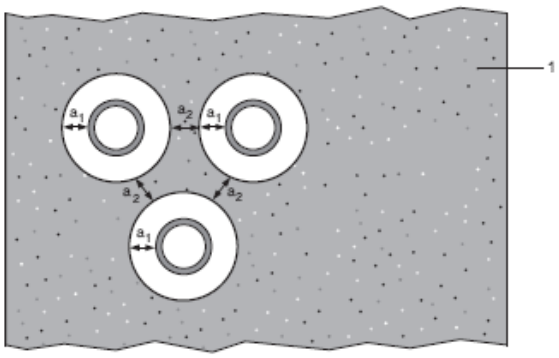
A.1 Flexible or Rigid wall constructions with wall thickness of minimum 100 mm

A.1.1 Penetration seals, in drywalls* and concrete/masonry walls

Penetration Seal: Combustible pipes sealed with Astro PFP FR Graphite, minimum 25 mm deep to both sides of the wall backed with Stonewool (minimum 35kg/m^3 density), minimum 25 mm deep. Minimum separation between penetration seals of 30 mm (a2).

Construction details:



Configuration 1	Configuration 2
	

Key

1 Supporting construction

a_1 Pipe / edge of seal separation (annular space)

a_2 Separation between penetration seals

* Partition wall must incorporate a core insulation as support for the backing material.

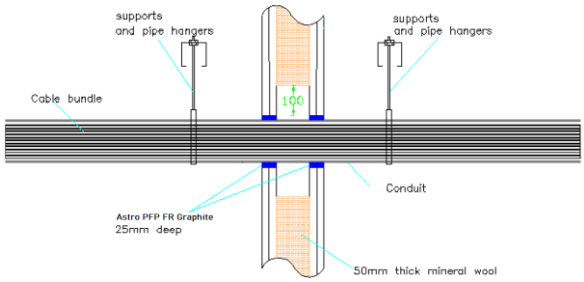
A.1.1.1

Services	Seal & Backing width (a1)	Permitted configuration for seal separation	Classification
PVC-U pipe according to EN 1329-1, EN 1452-2 and EN 1453-1, PVC-C according to EN 1566-1			
Diameter 40 mm, wall thickness 1.9 – 3.7 mm to diameter 110 mm, wall thickness 2.7-6.6 mm	10-30 mm	1 & 2	**EI 120 U/C, EI 120 C/C**
Diameter 40, wall thickness 1.9 – 3.7 mm		1 & 2	
Diameter 40 mm, wall thickness 1.9 – 3.7 mm to diameter 110 mm, wall thickness 2.7-6.6 mm		1 & 2	**EI 60 U/C, EI 60 C/C**
Diameter 40 mm, wall thickness 1.9 – 3.7 mm to diameter 110 mm, wall thickness 2.7-6.6 mm		1 & 2	**EI 120 U/C, EI 120 C/C**
PE pipe according to EN 1519-1, EN 12201-2 and EN 12006-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Diameter 40 mm, wall thickness 2.4-3.7 mm	10-30 mm	1 & 2	**EI 120 U/C, EI 120 C/C**
Diameter 40, wall thickness 2.4-3.7 mm to diameter 110 mm, wall thickness 4.3-10 mm		1 & 2	**EI 60 U/C, EI 60 C/C**
Diameter 110 mm, wall thickness 4.3-10 mm		1	**E 120 U/C, E 120 C/C** **EI 90 U/C, EI 90 C/C**
PP pipe according to EN 1852-1: 2009 or DIN8077/8078			
Diameter 110 mm, wall thickness 6.6 mm	30 mm	1 & 2	**EI 120 U/C, EI 120 C/C**
Diameter 40 mm, wall thickness 1.8 - 5.5 mm	10 mm	1 & 2	**EI 90 U/C**

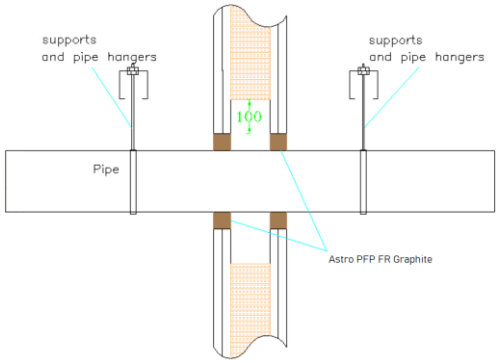
A.1.2 Penetration seals with no backing material, in drywalls and concrete/masonry walls

Penetration Seal: Combustible cable conduit or combustible pipes sealed with Astro PFP FR Graphite, minimum 25 mm deep to both sides of the wall without backing material. Minimum separation between penetration seals of 30 mm (a2).

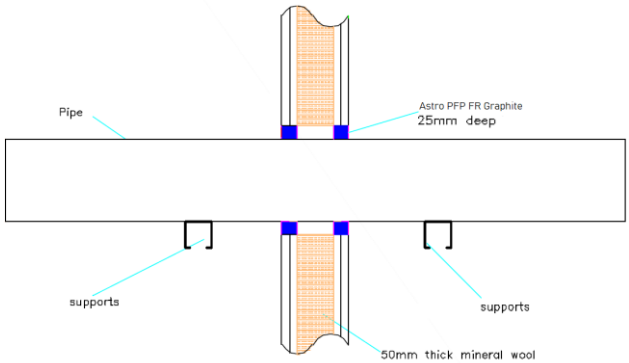
Construction details:



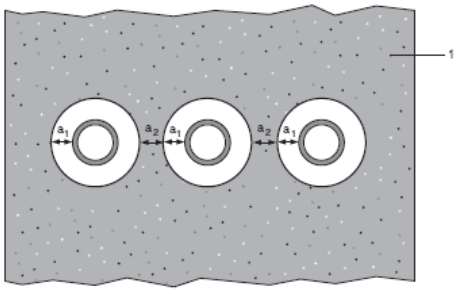
Construction details:



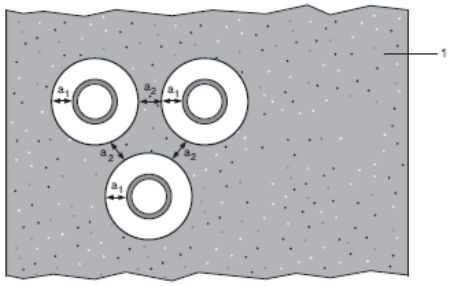
Construction details:



Configuration 1



Configuration 2



Key

1 Supporting construction

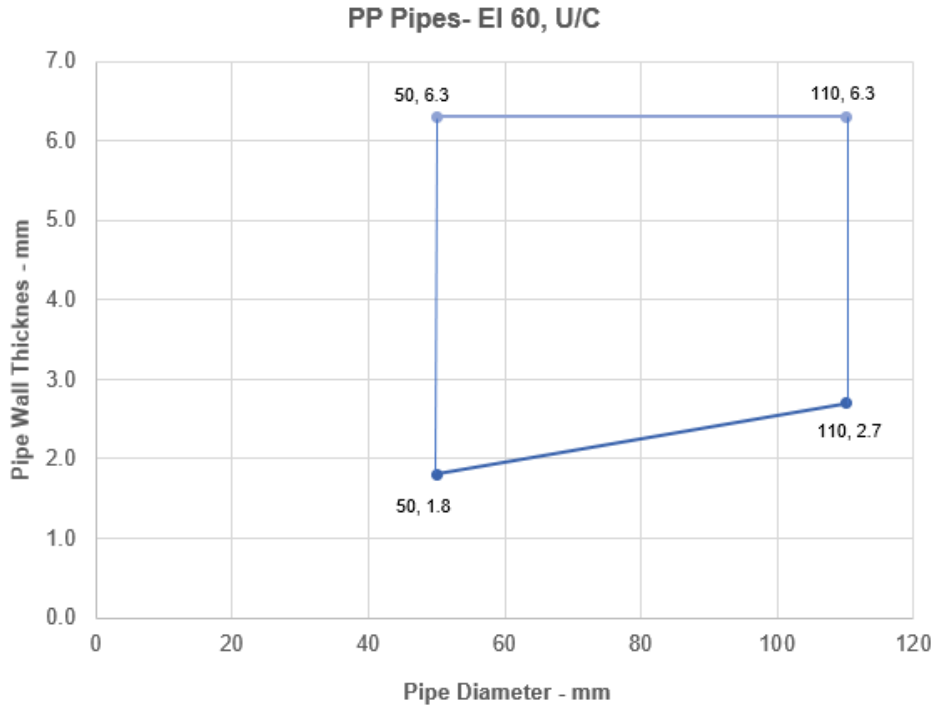
a_1 Pipe / edge of seal separation (annular space)

a_2 Separation between penetration seals

A.1.2.1

Services	Seal width (a1)	Permitted configuration for seal separation	Classification
PVC-U pipe according to EN 1329-1, EN 1452-2 and EN 1453-1, PVC-C according to EN 1566-1 or PP pipe according to EN 1852-1: 2009 or DIN8077/8078			
Maximum diameter 110 mm, wall thickness 1.9-6.6 mm for PVC pipes, fully or partially filled conduits with cables up to 20mm diameter	10-30 mm	1 & 2	**EI 90 U/C**
Maximum diameter 110 mm, wall thickness 2.7-6.6 mm for PP pipes, fully or partially filled conduits with cables up to 20mm diameter	10-30 mm	1 & 2	**EI 90 U/C**
PE pipe according to EN 1519-1, EN 12201-2 and EN 12006-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Maximum diameter 110 mm, wall thickness 2.4-10 mm, fully or partially filled conduits with cables up to 20 mm conduit	10-30 mm	1 & 2	**EI 60 U/C**
PVC-U pipe according to EN 1329-1, EN 1452-2 and EN 1453-1, PVC-C according to EN 1566-1			
Maximum 160 mm diameter, wall thickness 3.2-9.5 mm	10-30 mm	1 & 2	**EI 30 U/C**
Maximum 160 mm diameter, wall thickness 9.5 mm	10-30 mm	1 & 2	**EI 90 U/C**
PP pipe according to EN 1852-1: 2009 or DIN8077/8078			
Maximum 110 mm, wall thickness 2.7 mm	10–30 mm	1 & 2	**EI 60 C/C**
Maximum 110 mm*	10-30 mm	1 & 2	**EI 60 U/C**

*See below graph for interpolation pipe sizes

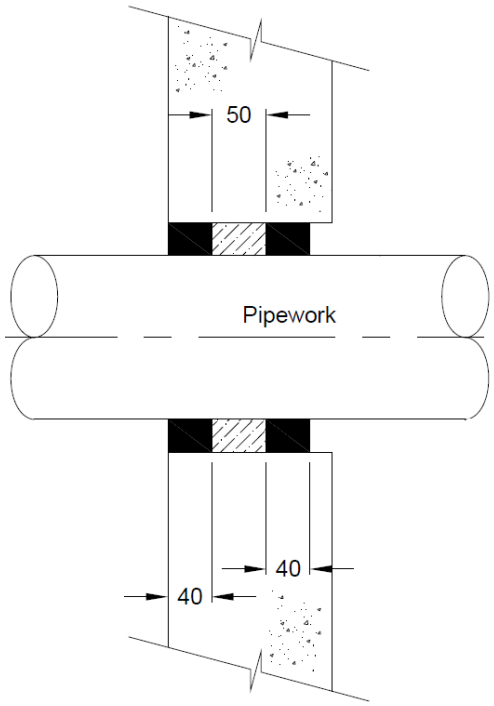


A.2 Rigid walls constructions with wall thickness of minimum 150 mm

A.2.1 Penetration seals for pipes, in concrete/masonry walls

Penetration Seal: Combustible pipes sealed with minimum 40 mm deep Astro PFP FR Graphite, to both sides of the wall backed Astro PFP Mineral Bio Wool 50 mm thick. Minimum separation between penetration seals of 30 mm.

Construction details:



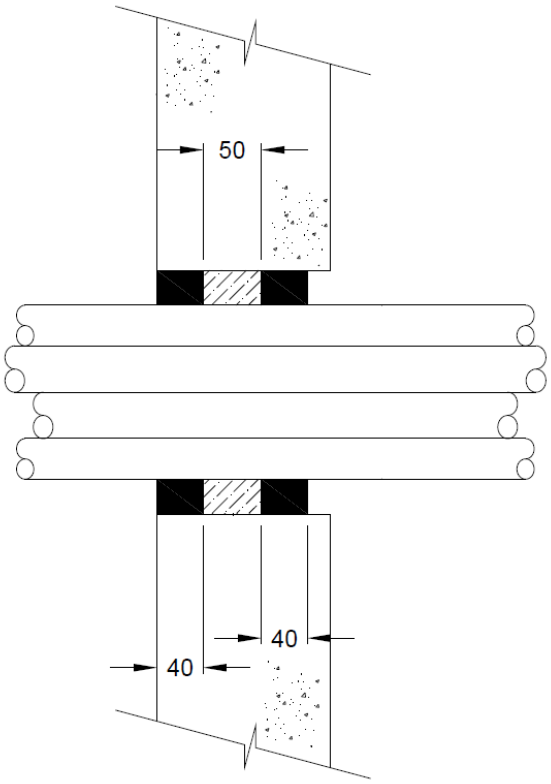
A.2.1.1

Services	Seal & Backing width	Classification
PVC-U pipe according to EN 1329-1, EN 1452-2 and EN 1453-1, PVC-C according to EN 1566-1		
Diameter 48 mm, wall thickness 3.2 mm	17 mm	**EI 240 U/C, EI 240 C/C**
Diameter 68 mm, wall thickness 2 mm	41 mm	
Diameter 110 mm, wall thickness 3.5 mm	22 mm	
PE pipe according to EN 1519-1, EN 12201-2 and EN 12006-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1		
Diameter 32 mm, wall thickness 3.2 mm	25 mm	**EI 240 U/C, EI 240 C/C**
ABS pipe according to EN 1455-1		
Diameter 36 mm, wall thickness 2.3 mm	23 mm	**EI 240 U/C, EI 240 C/C**
Diameter 110 mm, wall thickness 3.5 mm	26 mm	

A.2.2 Penetration seals for cables, in concrete/masonry walls

Penetration Seal: Cables sealed with minimum 40 mm deep Astro PFP FR Graphite, to both sides of the wall backed with ?? 2S, 50 mm thick. Minimum separation between penetration seals of 30 mm.

Construction details:



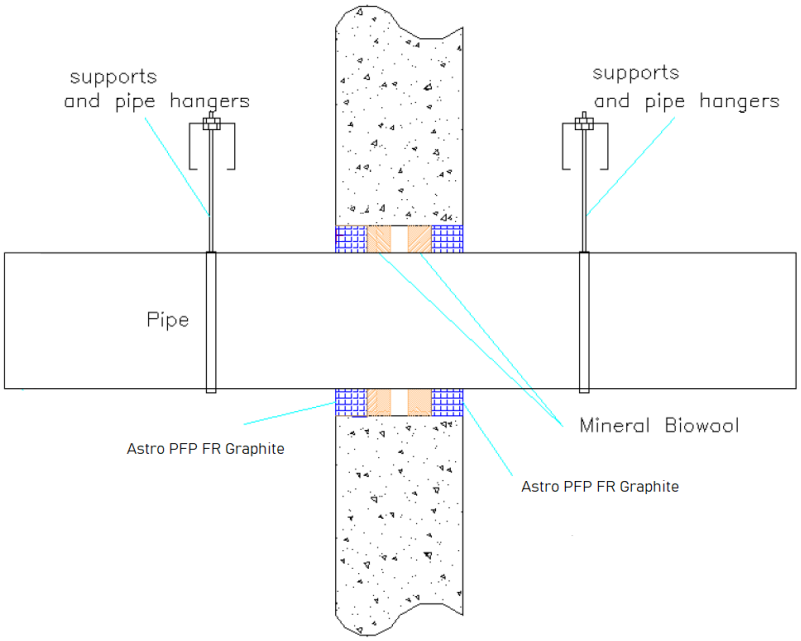
A.2.2.1

Services	Seal size (WxH or diameter)	Classification
150 x 25 mm perforated steel cable tray	Maximum 200 x 100 mm	**E 240, EI 180**
20 mm diameter, single copper core armoured cable		
Twin/earth cable		
Ø 100 mm bundle of up to 4 no. 20mm diameter, single copper core armoured cable and 12 no. twin/earth cables	Maximum 150 mm Ø	**E240, EI 60**

A.2.3 Penetration seals for pipes, in concrete/masonry walls

Penetration Seal: Combustible pipes sealed with minimum 35 mm deep Astro PFP FR Graphite, to both sides of the wall backed with Mineral Bio backing material, minimum 25 mm thick. Minimum separation between penetration seals of 30 mm.

Construction details:



A.2.3.1

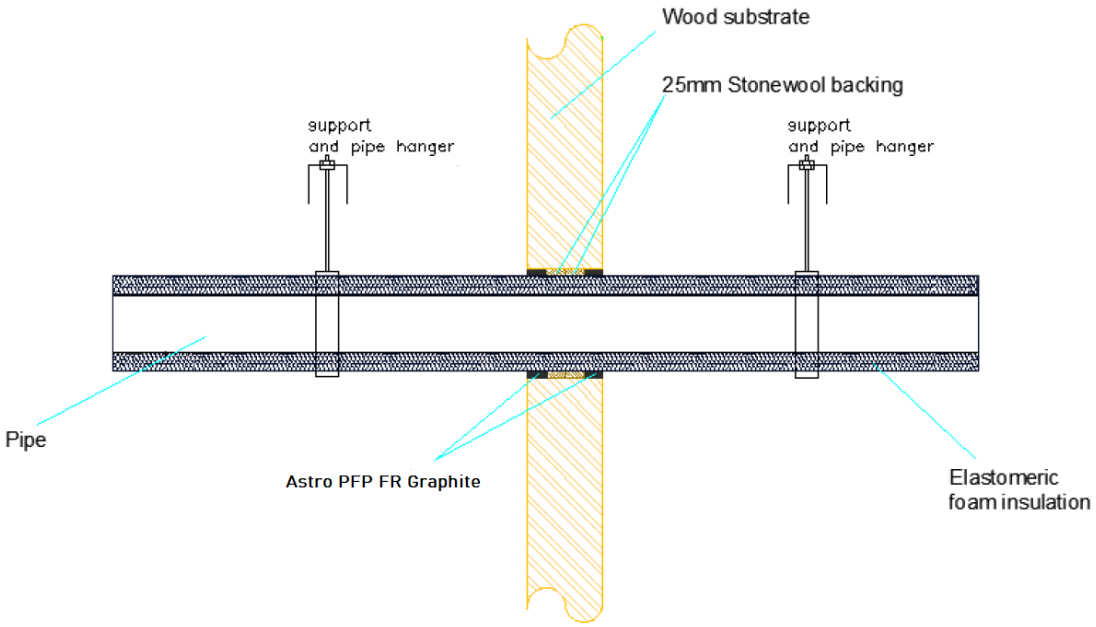
Services	Seal & Backing width (a1)	Classification
PVC-U pipe according to EN 1329-1, EN 1452-2 and EN 1453-1, PVC-C according to EN 1566-1		
Maximum 160 mm diameter, wall thickness 4.0-9.5 mm	10-30 mm	**EI 90 U/C**
Maximum 160 mm diameter, wall thickness 9.5 mm	10-30 mm	**E 240, EI 180 U/C**
PE pipe according to EN 1519-1, EN 12201-2 and EN 12006-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1		
Maximum 160 mm diameter, wall thickness 4.9-9.5mm	10-30 mm	**EI 30 U/C**
PP pipe according to EN 1852-1: 2009 or DIN8077/8078		
Maximum 160 mm diameter, wall thickness 6.2-9.1 mm	10 mm	**EI 30 U/C**

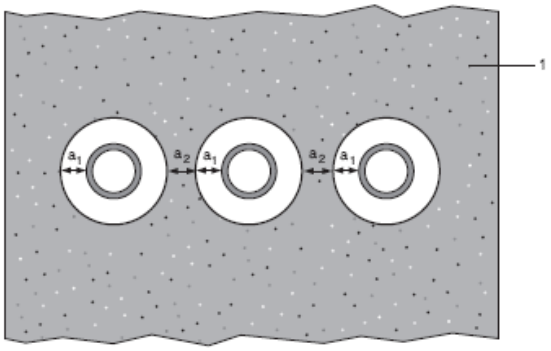
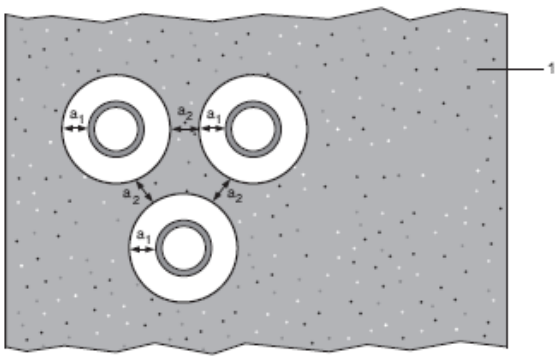
A.3 Timber wall constructions with wall thickness of minimum 100 mm

A.3.1 Pipe penetration seals, in timber walls

Penetration Seal: Metallic pipes insulated with Elastomeric insulation minimum class D-s3,d0, Continuous Sustained (CS), sealed with Astro PFP FR Graphite, minimum 25 mm deep to both sides of the wall and backed with Stonewool (minimum 33kg/m^3 density), minimum 25 mm deep. Minimum separation between penetration seals of 30 mm (a2).

Construction details:



Configuration 1	Configuration 2
	

Key

1 Supporting construction

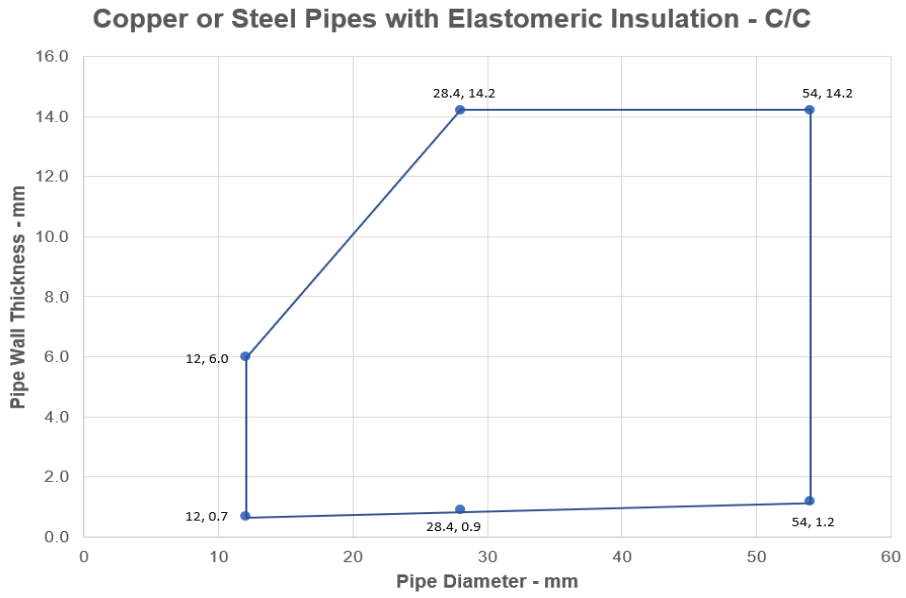
a_1 Pipe / edge of seal separation (annular space)

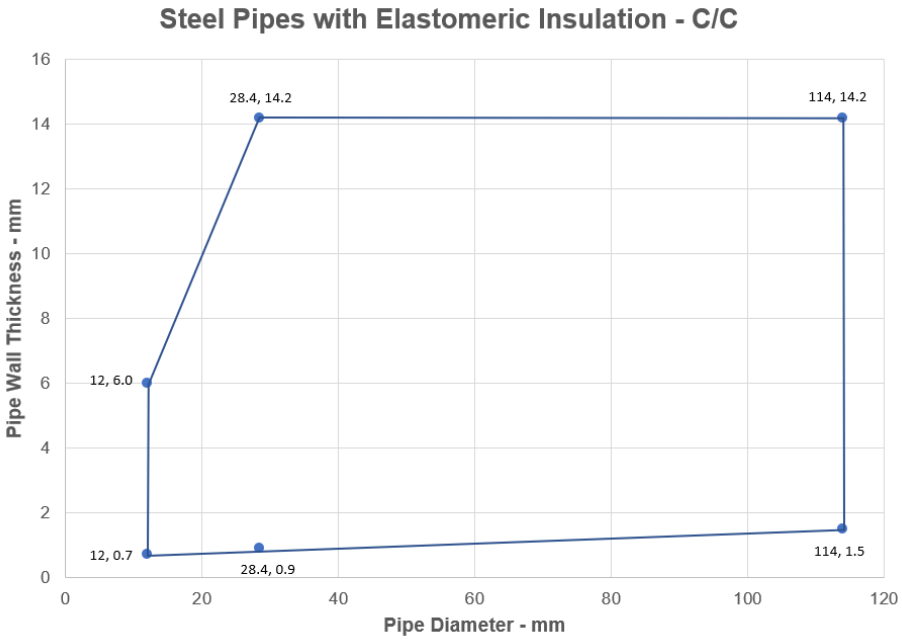
a_2 Separation between penetration seals

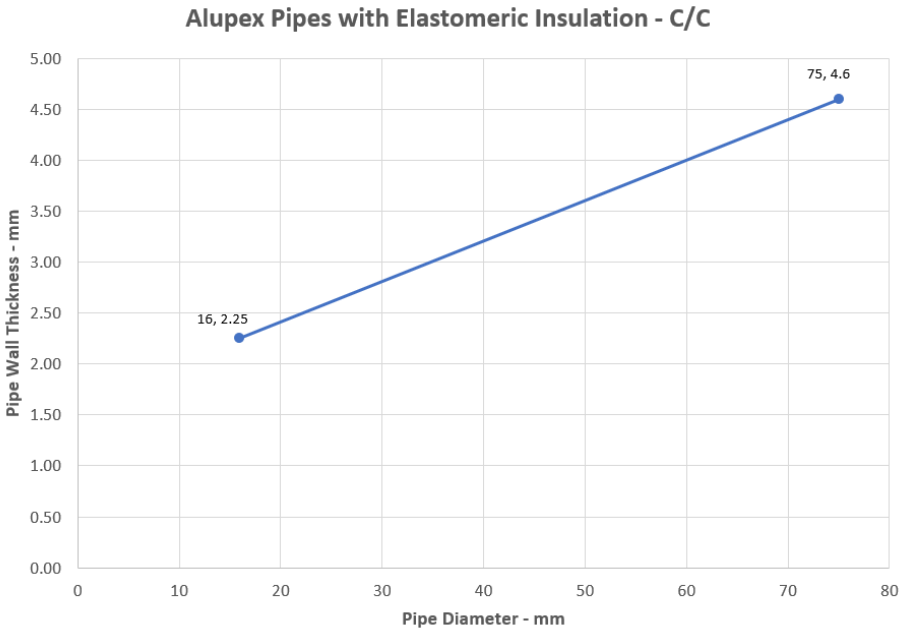
A.3.1.1

Services	Seal & backing material width (a1)	Permitted configuration for seal separation	Insulation CS	Classification
Copper, mild or stainless steel pipe				
Diameter 12 mm, wall thickness 0.7	10 mm	1	13 mm Elastomeric insulation minimum class D-s3, d0	**EI 120 C/C**
Diameter 12-54 mm, wall thickness*				**E 120 C/C, EI 90 C/C**
Diameter 12-54 mm, wall thickness*			14-25 mm Elastomeric insulation minimum class D -s3, d0	**E 120 C/C, EI 30 C/C**
Mild or stainless steel pipe, with Elastomeric insulation minimum class D-s3, d0				
Diameter 12-114 mm, wall thickness*	10 mm	1	13 mm Elastomeric insulation minimum class D -s3, d0	**EI 90 C/C**
Diameter 12-114 mm, wall thickness*			14-25 mm Elastomeric insulation minimum class D-s3, d0	**E 90 C/C, EI 45 C/C**
Diameter 114 mm, wall thickness 1.5-14.2			13 mm Elastomeric insulation minimum class D-s3, d0	**EI 90 C/U**
Diameter 114 mm, wall thickness 1.5-14.2			13-25 mm Elastomeric insulation minimum class D-s3, d0	**E 90 C/U, EI 45 C/U**
Alupex pipe, with Elastomeric insulation minimum class D-s3, d0				
Diameter 16 mm, wall thickness 2.25	10 mm	1	13 mm Elastomeric insulation minimum class D-s3, d0	**EI 120 C/C**
Diameter 16-75 mm, wall thickness*				**E 120 C/C, EI 45 C/C**
Diameter 16-75 mm, wall thickness*			14-24 mm Elastomeric insulation minimum class D-s3, d0	**E 90 C/C, EI 45 C/C**
Diameter 16-75 mm, wall thickness*			25 mm Elastomeric insulation minimum class D -s3, d0	**EI 90 C/C**

See below graph for interpolation pipe sizes




Steel Pipes with Elastomeric Insulation - C/C
Pipe Wall Thickness - mm
Pipe Diameter - mm
28.4, 14.2
114, 14.2
12, 6.0
12, 0.7
28.4, 0.9
114, 1.5
0
2
4
6
8
10
12
14
16
0
20
40
60
80
100
120

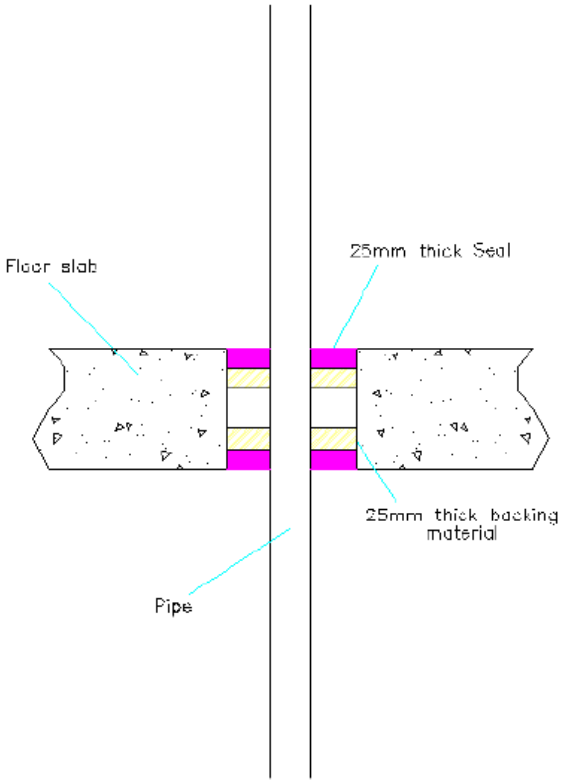

Alupex Pipes with Elastomeric Insulation - C/C
Pipe Wall Thickness - mm
Pipe Diameter - mm
75, 4.6
16, 2.25
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
0
10
20
30
40
50
60
70
80

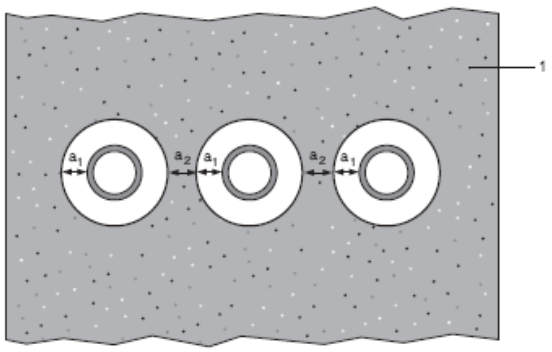
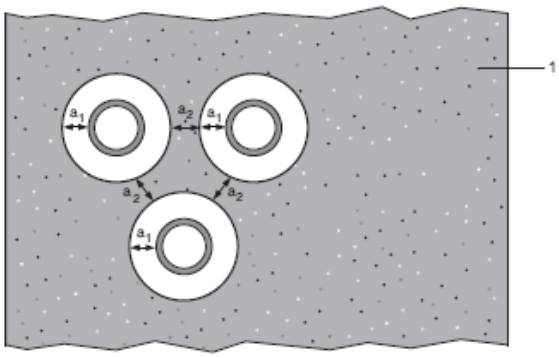
A.4 Rigid floor constructions with floor thickness of minimum 150 mm

A.4.1 Penetration seals, surface mounted in concrete floors

Penetration Seal: Combustible pipes sealed with Astro PFP FR Graphite, to both sides of the floor backed with Stonewool (minimum 35kg/m^3 density), minimum 25 mm deep. Minimum separation between penetration seals of 30 mm.

Construction details:



Configuration 1	Configuration 2
	

Key
1 Supporting construction
a_1 Pipe / edge of seal separation (annular space)
a_2 Separation between penetration seals

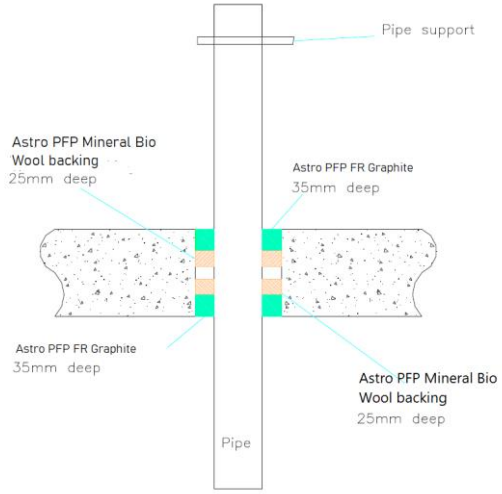
A.4.1.1

Services	Seal & Backing width	Permitted configuration for seal separation	Classification
PVC-U pipe according to EN 1329-1, EN 1452-2 and EN 1453-1, PVC-C according to EN 1566-1			
Diameter 40 mm, wall thickness 1.8 – 3.7 mm	10-30 mm	1 & 2	**EI 240 U/U, EI 240 C/U, EI 240 U/C, EI 240 C/C**
Diameter 40 mm, wall thickness 1.8 – 3.7 mm to diameter 110 mm, wall thickness 2.7-6.6 mm		1 & 2	**EI 90 C/U, EI 90 C/C**
PE pipe according to EN 1519-1, EN 12201-2 and EN 12006-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Diameter 40 mm, wall thickness 2.4-3.7 mm	10-30 mm	1 & 2	**EI 60 U/U, EI 60 C/U, EI 60 U/C, EI 60 C/C**
			EI 240 U/C, EI 240 C/C
Diameter 40, wall thickness 2.4-3.7 mm to diameter 110 mm, wall thickness 4.3-10 mm		1 & 2	**EI 60 U/C, EI 60 C/C**
Diameter 110 mm, wall thickness 4.3-10 mm		1 & 2	**EI 90 U/C, EI 90 C/C**
Diameter 110 mm, wall thickness 10 mm			**EI 60 U/U, EI 60 C/U, EI 60 U/C, EI 60 C/C**

A.4.2 Penetration seals, surface mounted in concrete floors

Penetration Seal: Combustible pipes sealed with Astro PFP FR Graphite, minimum 35 mm deep to both sides of the floor backed with Astro PFP Mineral Bio Wool (128kg/m^3 density), minimum 25 mm deep. Minimum separation between penetration seals of 30 mm.

Construction details:



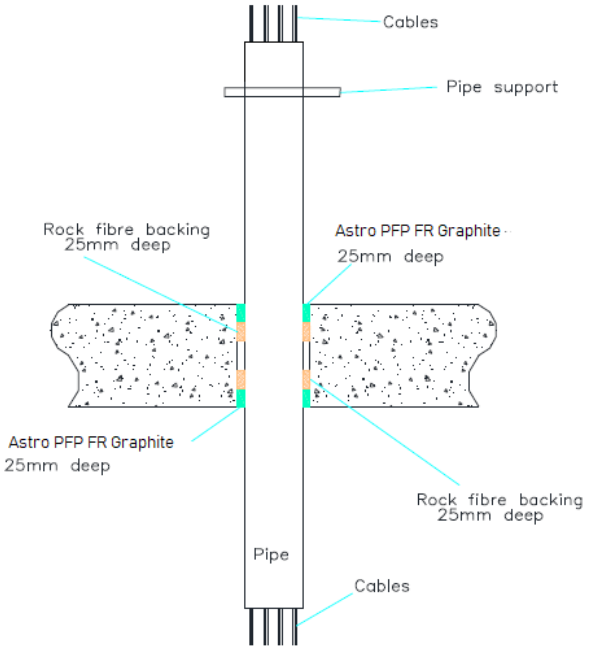
A.4.2.1

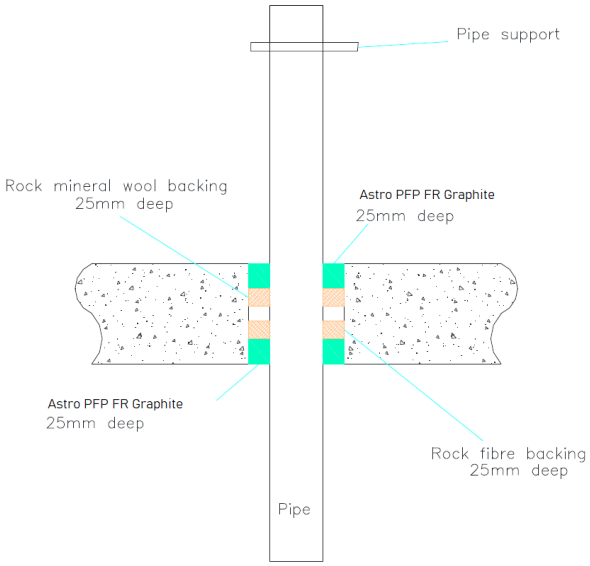
Services	Seal & Backing width (a1)	Classification
PVC-U pipe according to EN 1329-1, EN 1452-2 and EN 1453-1, PVC-C according to EN 1566-1		
Maximum 160 mm diameter, wall thickness 4.0-9.5mm	10-30 mm	**EI 60 U/C**
PE pipe according to EN 1519-1, EN 12201-2 and EN 12006-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1		
Maximum 160 mm diameter, wall thickness 4.9-14.6 mm	10-30 mm	**EI 30 U/C**
Maximum 160 mm diameter, wall thickness 14.6 mm	10-30 mm	**EI 60 U/C**

A.4.3 Penetration seals, surfaces mounted in concrete floors

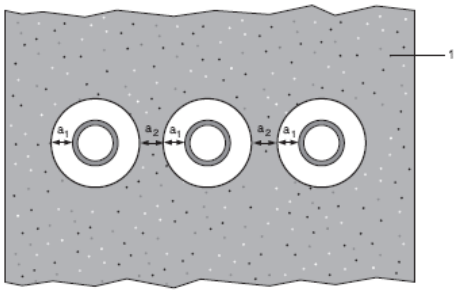
Penetration Seal: Combustible pipes sealed with Astro PFP FR Graphite, minimum 25 mm deep to both sides of the floor backed with Rock mineral wool (minimum 33kg/m^3 density), minimum 25 mm deep. Minimum separation between penetration seals of 30 mm (a2).

Construction details:

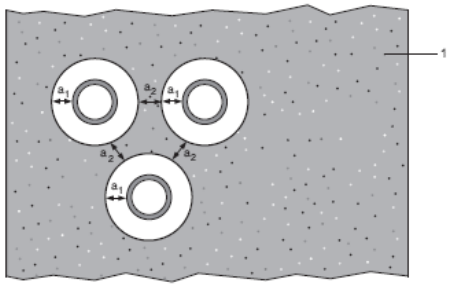




Configuration 1



Configuration 2



Key

1 Supporting construction

a_1 Pipe / edge of seal separation (annular space)

a_2 Separation between penetration seals

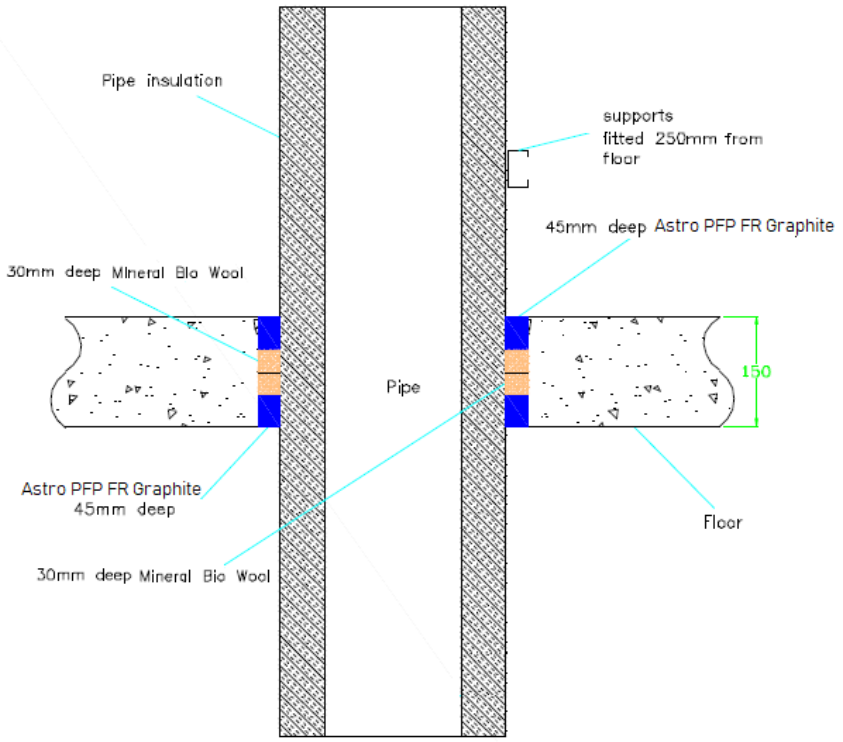
A.4.3.1

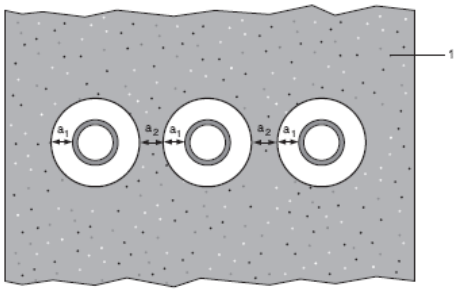
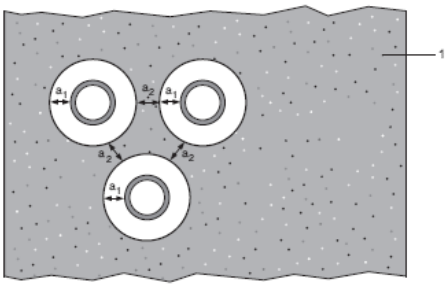
Services	Seal width (a1)	Permitted configuration for seal separation	Classification
PVC-U pipe according to EN 1329-1, EN 1452-2 and EN 1453-1, PVC-C according to EN 1566-1 or PP pipe according to EN 1852-1: 2009 or DIN8077/8078			
Maximum diameter 110 mm, wall thickness 1.8-6.6 mm for PVC pipes, fully or partially filled conduits with cables up to 20 mm diameter	10-30 mm	1 & 2	**EI 90 U/C**
Maximum diameter 110 mm, wall thickness 2.7 mm for PP pipes, fully or partially filled conduits with cables up to 20 mm diameter	10-30 mm	1 & 2	**EI 90 U/C**
Maximum diameter 110 mm, wall thickness 1.8-6.3 mm for PP pipes, fully or partially filled conduits with cables up to 20 mm diameter	10-30 mm	1 & 2	**EI 30 U/C**
PE pipe according to EN 1519-1, EN 12201-2 and EN 12006-1, ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1			
Maximum diameter 110 mm, wall thickness 2.4-10 mm, fully or partially filled conduits with cables up to 20 mm diameter	10-30 mm	1 & 2	**EI 60 U/C**
PP pipe according to EN 1852-1: 2009 or DIN8077/8078			
Maximum 40 mm diameter, wall thickness 1.8 mm	10-30 mm	1 & 2	**EI 120 C/C**
Maximum 110 mm diameter, wall thickness 1.8-6.3 mm	10-30 mm	1 & 2	**EI 30 U/C**

A.4.4 Penetration seals, surface mounted in concrete floors

Penetration Seal: Metallic pipes insulated with Elastomeric insulation minimum class B-s3, d0, Continuous Sustained (CS), sealed with Astro PFP FR Graphite, minimum 45 mm deep to both sides of the floor and backed with Astro PFP Mineral Bio Wool (128kg/m^3 density), minimum 30 mm deep. Minimum separation between penetration seals of 30 mm mm (a2).

Construction details:



Configuration 1	Configuration 2
	

Key

1 Supporting construction

a_1 Pipe / edge of seal separation (annular space)

a_2 Separation between penetration seals

A.4.4.1

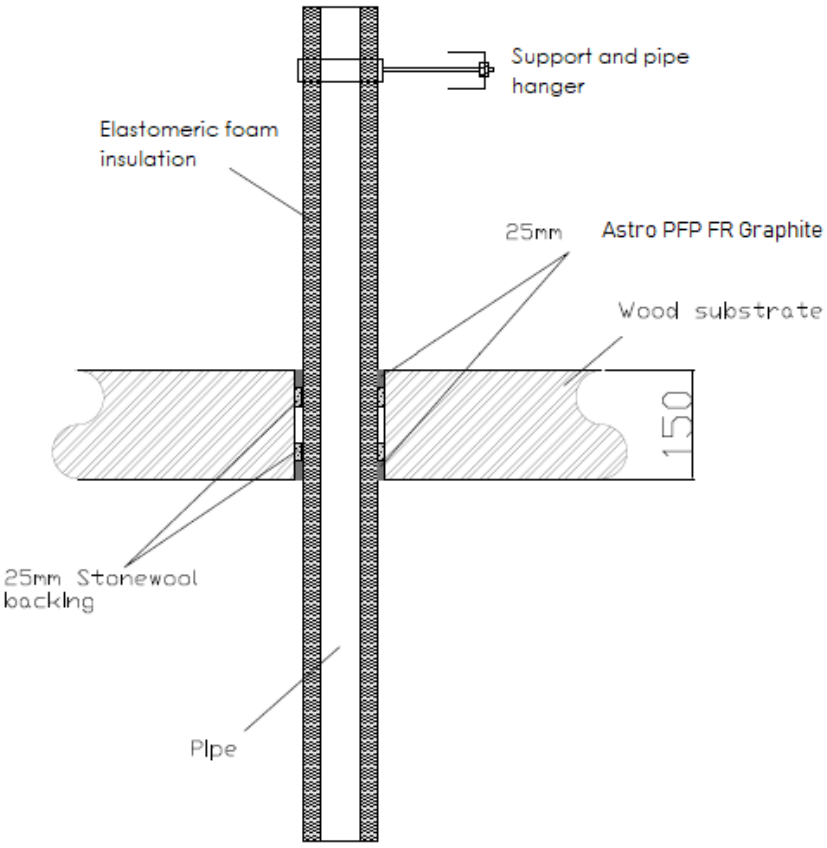
Services	Seal & backing material width (a1)	Permitted configuration for seal separation	Insulation CS	Classification
Mild or stainless steel pipe, with Elastomeric insulation minimum class B-s3, d0				
Maximum 324 mm diameter, wall thickness 1.0-14.2 mm	10-30 mm	1 & 2	25-50 mm Elastomeric insulation minimum class B-s3, d0	**EI 60 C/U**
Maximum 324 mm diameter, wall thickness 6.35-14.2 mm	10-30 mm	1 & 2	50 mm Elastomeric insulation minimum class B-s3, d0	**EI 120 C/U**

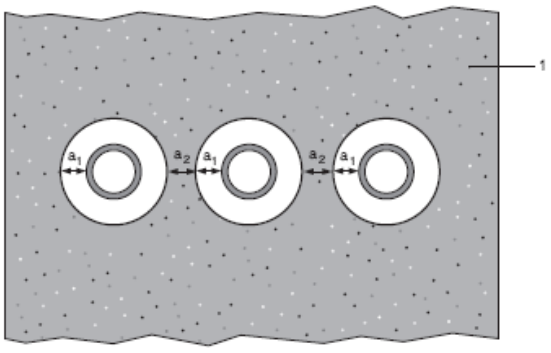
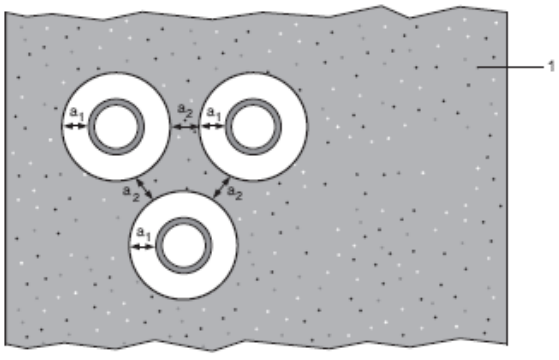
A.5 Timber floor constructions with floor thickness of minimum 150 mm

A.5.1 Pipe penetration seals, in timber floors

Penetration Seal: Metallic pipes insulated with Elastomeric insulation minimum class D-s3,d0, Continuous Sustained (CS), sealed with Astro PFP FR Graphite, minimum 25 mm deep to both sides of the floor and backed with Stonewool (minimum 33kg/m^3 density), minimum 25 mm deep. Minimum separation between penetration seals of 0 mm (a2).

Construction details:



Configuration 1	Configuration 2
	

Key

1 Supporting construction

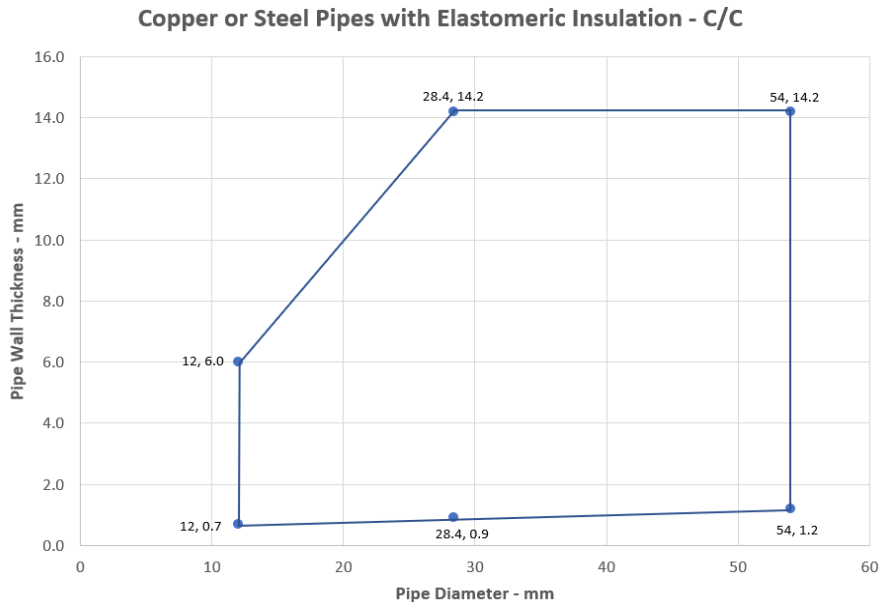
a_1 Pipe / edge of seal separation (annular space)

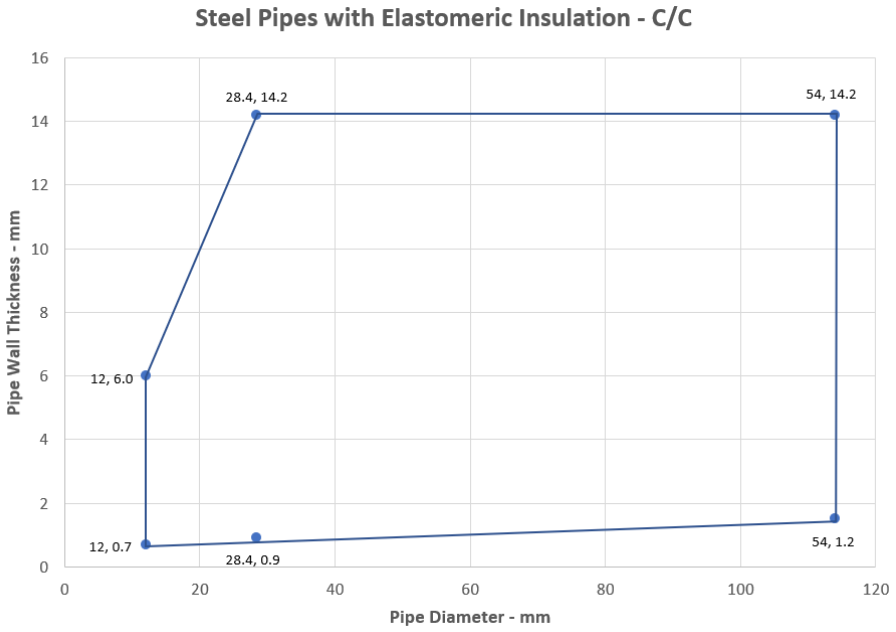
a_2 Separation between penetration seals

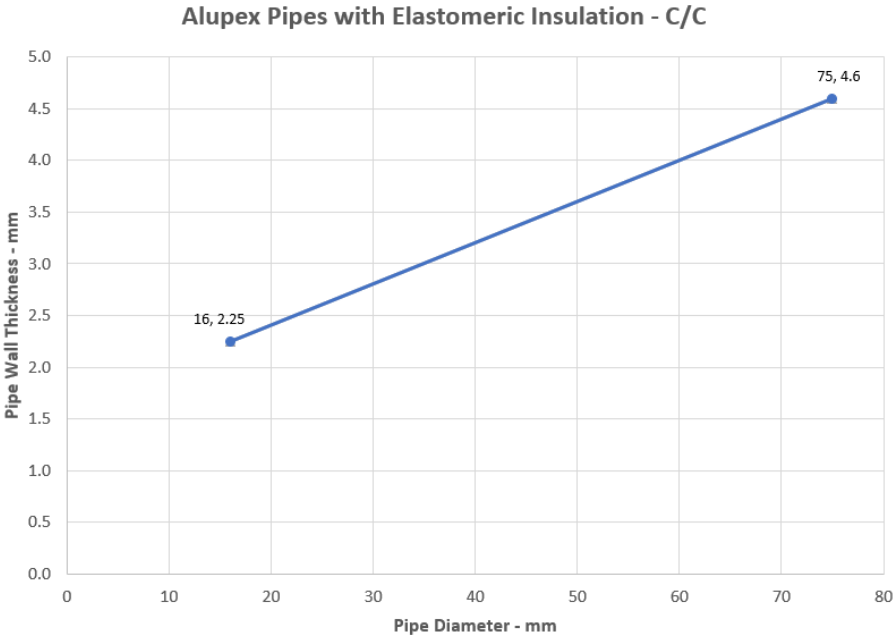
A.5.1.1

Services	Seal & backing material width (a1)	Permitted configuration for seal separation	Insulation CS	Classification
Copper, mild or stainless steel pipe				
Diameter 12 mm, wall thickness 0.7	10 mm	1	9 mm Elastomeric insulation minimum class D-s3, d0	**EI 120 C/C**
Diameter 12-54 mm, wall thickness*				**E 120 C/C, EI 45 C/C**
Diameter 12-54 mm, wall thickness*			10-25 mm Elastomeric insulation minimum class D-s3, d0	**E 120 C/C, EI 30 C/C**
Mild or stainless steel pipe, with Elastomeric insulation minimum class D-s3, d0				
Diameter 12-114 mm, wall thickness*	10 mm	1	9-24 mm Elastomeric insulation minimum class D-s3, d0	**E 120 C/C, EI 45 C/C**
Diameter 12-114 mm, wall thickness*			25 mm Elastomeric insulation minimum class D-s3, d0	**E 120 C/C, EI 60 C/C**
Diameter 114 mm, wall thickness 1.5-14.2			9-25 mm Elastomeric insulation minimum class D-s3, d0	**E 120 C/U, EI 45 C/U**
Diameter 114 mm, wall thickness 1.5-14.2			25 mm Elastomeric insulation minimum class D-s3, d0	**E 120 C/U, EI 60 C/U**
Alupex pipe, with Elastomeric insulation minimum class D-s3, d0				
Diameter 16 mm, wall thickness 2.25	10 mm	1	9 mm Elastomeric insulation minimum class D-s3, d0	**EI 120 C/C**
Diameter 16-75 mm, wall thickness*			9-24 mm Elastomeric insulation minimum class D-s3, d0	**E 120 C/C, EI 60 C/C**
Diameter 16-75 mm, wall thickness*			25 mm Elastomeric insulation minimum class D-s3, d0	**E 120 C/C, EI 90 C/C**

*See below graph for interpolation pipe sizes




Steel Pipes with Elastomeric Insulation - C/C
Pipe Wall Thickness - mm
Pipe Diameter - mm
28.4, 14.2
54, 14.2
12, 6.0
12, 0.7
28.4, 0.9
54, 1.2
0
2
4
6
8
10
12
14
16
0
20
40
60
80
100
120


Alupex Pipes with Elastomeric Insulation - C/C
Pipe Wall Thickness - mm
Pipe Diameter - mm
75, 4.6
16, 2.25
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
0
10
20
30
40
50
60
70
80

ANNEX B – Air Permeability – Astro PFP FR Graphite

Product tested	25mm deep x 30mm wide Astro PFP FR Graphite		
Summary of testing procedure			Result
	Pressure (Pa)	Leakage (m^3/h)	Leakage ($m^3/m^2/h$)
Results under negative chamber pressure	25	0.00	0.00
	50	0.00	0.00
	100	0.00	0.00
	200	0.00	0.00
	300	0.02	0.56
	450	0.06	1.67
	600	0.12	3.33
Results under positive chamber pressure	25	0.00	0.00
	50	0.00	0.00
	100	0.00	0.00
	200	0.00	0.00
	300	0.00	0.00
	450	0.03	0.83
	600	0.13	3.61

